CLAIMS

1. An olefin branched macromonomer satisfying the following (a) and (b):

(a) its weight-average molecular weight (Mw) measured through gel permeation chromatography (GPC) falls between 400 and 200000;

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer.

2. The olefin branched macromonomer as claimed in claim 1, which satisfies any of the following (i), (ii) and (iii):

(i) the ratio of the temperature dependency (E_2) of the macromonomer solution viscosity to the temperature dependency (E_1) of the solution viscosity of the linear polymer which has the same type of monomer, the same chemical composition and the same intrinsic viscosity as those of the macromonomer, E_2/E_1, satisfies the following relationship:

$1.01 \leq E_2/E_1 \leq 2.5$;

(ii) the ratio of the number-average molecular weight measured through GPC (GPC-Mn) to the number-average molecular weight measured through ^{13}C-NMR (NMR-Mn) of the macromonomer satisfies the following relationship:

(GPC-Mn)/(NMR-Mn) > 1;

(iii) the macromonomer has branches existing not at the α- and/or β-substituents of the monomer that constitutes the macromonomer, and the number of the branches falls between 0.01

and 40 in one molecule of the macromonomer.

3. The olefin branched macromonomer as claimed in claim 1 or 2, for which the monomer to constitute it is propylene, or a combination of propylene and at least one selected from ethylene, α-olefins having from 4 to 20 carbon atoms, cyclic olefins and styrenes, and of which the propylene content falls between 0.1 and 100 mol%.

4. The olefin branched macromonomer as claimed in claim 1 or 2, for which the monomer to constitute it is ethylene, or a combination of ethylene and at least one selected from α-olefins having from 4 to 20 carbon atoms, cyclic olefins and styrenes, and of which the ethylene content falls between 50 and 99.9 mol%.

5. The olefin branched macromonomer as claimed in claim 1 or 2, for which the monomer to constitute it is ethylene or propylene.

6. An olefin graft copolymer obtained by copolymerizing the olefin branched macromonomer of any of claims 1 to 5 with at least one comonomer selected from ethylene, propylene, α-olefins having from 4 to 20 carbon atoms, cyclic olefins and styrenes, in the presence of a metallocene catalyst.

7. An olefin graft copolymer obtained by copolymerizing the olefin branched macromonomer of any of claims 1 to 5 with at least one comonomer selected from ethylene, propylene, α-olefins having from 4 to 20 carbon atoms, cyclic olefins and

styrenes, in the presence of a Ziegler-Natta catalyst.

8. The olefin graft copolymer as claimed in claim 6 or 7, which satisfies the following (1) and/or (2):

(1) its intrinsic viscosity [η] measured in a solvent decalin at 135°C falls between 0.3 and 15 dl/g;

(2) it contains from 0.01 to 70 % by weight of the olefin branched macromonomer of any of claims 1 to 5.

9. An olefin resin composition comprising 100 parts by weight of a thermoplastic resin, and from 0.05 to 70 parts by weight of the olefin graft copolymer of any of claims 6 to 8.

10. The olefin resin composition as claimed in claim 9, of which the relaxation rate of the long-term relaxation component measured through solid ^{1}H-NMR ($1/R_1$) falls between 1.0 and 2.0 (1/sec).

11. The olefin resin composition as claimed in claim 9 or 10, of which the ratio of the relaxation rate ($1/R_1$) of claim 10 to the relaxation rate $(1/R_1)_0$ of the long-term relaxation component, measured through solid ^{1}H-NMR, of a resin composition not containing the propylene branched macromonomer of any of claims 1 to 5, $[(1/R_1)/(1/R_1)_0]$, satisfies the following relationship:

$$[(1/R_1)/(1/R_1)_0] \geq 1.01.$$

12. A propylene macromonomer satisfying the following (a), (b) and (c):

(a) its weight-average molecular weight (Mw) measured

through gel permeation chromatography (GPC) falls between 800 and 500000;

(b) its vinyl content is at least 70 mol% of all the unsaturated groups in the macromonomer;

(c) its propylene content falls between 50 and 100 mol%.

13. The propylene macromonomer as claimed in claim 12, for which the monomer to constitute it is propylene, or a combination of propylene and at least one selected from ethylene, α-olefins having from 4 to 20 carbon atoms, cyclic olefins and styrenes.

14. The propylene macromonomer as claimed in claim 12 or 13, for which the monomer to constitute it is ethylene and propylene.

15. An olefin graft copolymer obtained by copolymerizing the propylene macromonomer of any of claims 12 to 14 with at least one comonomer selected from ethylene, propylene, α-olefins having from 4 to 20 carbon atoms, cyclic olefins and styrenes, in the presence of a metallocene catalyst.

16. An olefin graft copolymer obtained by copolymerizing the propylene macromonomer of any of claims 12 to 14 with at least one comonomer selected from ethylene, propylene, α-olefins having from 4 to 20 carbon atoms, cyclic olefins and styrenes, in the presence of a Ziegler-Natta catalyst.

17. The olefin graft copolymer as claimed in claim 15

or 16, which contains from 0.01 to 40 % by weight of the propylene macromonomer of any of claims 12 to 14.

18. The propylene graft copolymer as claimed in any of claims 15 to 17, which satisfies the following (1) and/or (2):

(1) its intrinsic viscosity [η] measured in a solvent decalin at 135°C falls between 0.3 and 15 dl/g;

(2) the ratio of the weight-average molecular weight (Mw) to the number-average molecular weight (Mn) thereof measured through GPC, Mw/Mn, falls between 1.5 and 4.5.

19. An olefin resin composition comprising 100 parts by weight of a thermoplastic resin, and from 0.05 to 70 parts by weight of the propylene graft copolymer of any of claims 15 to 18.

20. The olefin resin composition as claimed in claim 19, of which the relaxation rate of the long-term relaxation component measured through solid ^{1}H-NMR ($1/R_1$) falls between 1.0 and 2.0 (1/sec).

21. The olefin resin composition as claimed in claim 19 or 20, of which the ratio of the relaxation rate ($1/R_1$) of claim 20 to the relaxation rate $(1/R_1)_0$ of the long-term relaxation component, measured through solid ^{1}H-NMR, of a resin composition not containing the propylene graft copolymer of any of claims 15 to 18, $[(1/R_1)/(1/R_1)_0]$, satisfies the following relationship:

$$[(1/R_1)/(1/R_1)_0] \geq 1.01.$$